Fact Sheets

SRS

Spent Nuclear Fuel at SRS

The Savannah River Site provides for safe receipt and interim storage of irradiated spent nuclear fuel (SNF) assemblies from SRS reactors and from test and research reactors, domestic and foreign. The fuel is stored in underwater facilities until it is stabilized for final disposition.

SRS's spent nuclear fuel is managed under various National Environmental Policy Act documents, including the SNF Programmatic Environmental Impact Statement, the Foreign Research Reactor Environmental Impact Statement, the Interim Management of Nuclear Materials Environmental Impact Statement, and the SRS SNF Environmental Impact Statement.

K and L Areas

Underwater storage facilities, called disassembly basins, are located in all five of SRS's reactor areas. These facilities were designed to store spent nuclear fuel and target assemblies discharged from the reactor cores. This storage allowed the nuclear material to cool after being irradiated in the reactors. The basins were also used to prepare the nuclear materials for transport to the F and H Areas processing facilities.

Only L and K basins still contain fuel material. The basins have concrete walls 3 feet thick and hold 3.5 million gallons of water with pool depths of 17 to 30 feet. Although all assemblies are now "cold" enough to no longer require water cooling, water provides shielding to protect workers from radiation.

Each basin has four main sections used to receive, prepare, and store the fuel. The fuel assemblies are transferred through these sections via narrow vertical gateways used to isolate the sections.

In 1996, the L Basin equipment was reconfigured to safely handle and store spent nuclear fuel (SNF) from off-site (foreign and domestic) research reactors. The first off-site fuel was received and stored in February 1997.

As of April 2002, K and L basin inventories included several hundred SRS fuel assemblies in addition to the greater than 7,500 research reactor spent fuel assemblies received from offsite facilities. Additionally, the basins contain other miscellaneous nuclear materials, some of which will require special handling and disposal. Up to 8,000 additional assemblies are projected to be received and stored in L Basin over the next 10 years.

Receiving Basin for Offsite Fuels

The Receiving Basin for Offsite Fuels (RBOF) is located in H Area, near the center of the site. RBOF has been receiving and storing off-site and on-site fuels since 1964.

The fuel storage facility is about 139 by 148 feet, covering about 15,000 square feet. It consists of an unloading basin, two storage basins, a repackaging basin, a disassembly basin, and an inspection basin, all under water. The basin walls are coated with a phenolic resin-based paint, and the basin floor has a stainless steel plate covering it. The total volume of the basins, including with the interconnecting transfer canals, is about 500,000 gallons of water.

A typical SRS-irradiated spent fuel assembly is about 14 feet long and 3 to 4 inches in diameter. In comparison, off-site research-reactor assemblies typically are about 2 feet long and 3 inches square, but are packaged in 11- and 14-foot long aluminum containers for more efficient underwater storage. The packaged fuel is placed in RBOF's two storage basins.

In an effort to save money and consolidate operations, RBOF receives only specific new fuels. Almost all offsite fuels are now accepted and stored in SRS's L Basin, which was recently reconfigured to provide the same functions as RBOF. Efforts are under way to transfer all fuel currently in the facility to L Basin or H Canyon by mid-2006. As of April 2002, the basin contained approximately 2,365 assemblies representing 30 different fuel types.

About 75 percent of the fuels remaining to be transferred from RBOF are clad in stainless steel or zirconium and cannot be processed in existing SRS facilities without process modifications. These assemblies are scheduled to be shipped to the Idaho National Engineering and Environmental Laboratory starting around 2010.

The Future of SNF

The DOE is committed to an aggressive program for identifying, developing and implementing alternate technologies to conventional chemical reprocessing for the stabilization and final disposition of aluminum-based research reactor SNF, in a manner that will be "road-ready" for disposal in DOE's planned geologic repository. The two most promising technologies are melt-dilute and direct disposal.

In melt-dilute, furnaces melt the SNF and dilute the uranium enrichment, while also reducing the volume needed for storage and disposal. A facility called the L Experimental Facility was built in L Area to provide pilot-scale, radiological testing of actual irradiated fuel assemblies using the melt-dilute technology. Information from these tests would be used to design and build the Treatment and Storage Facility (TSF), which would be built in 105-L, the building that formerly housed L Reactor.

The direct disposal process, as the name implies, dries the fuel and packages it in special containers with no further stabilization required for final disposition.

The final decision as to which technology will be used – one of these or another – is yet to be determined. The decision is being revisited under DOE's Top-To-Bottom review.